

Computer Rooms Feel the Heat

IT Managers Find Novel Ways to Cool Powerful Servers

By JIM CARLTON
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Companies and institutions are exploiting the new power of video, fancy Web graphics and expanded data storage, and they also are finding an old problem has come back: The servers that do those tasks are getting too hot to handle for some computer rooms.

Today's powerful computers may be more cost-effective and typically don't take up any more space than the machines they replace, but they produce far more heat. Since 2000, the average power per watt in data centers -- a measure of how much heat computers generate -- has, in some cases, quadrupled to more than 200 from about 50, industry officials said.

The result can be a power outage in these data rooms, and a scramble by information-technology managers to cope. Many IT managers prefer to keep the temperature in their computer rooms in the 60s, and they are battling the heat with both traditional and novel approaches, ranging from bigger facilities with more air conditioning to on-board liquid coolers and floor tiles equipped with fans.

The Pomona Valley Hospital Medical Center in Pomona, Calif., had packed so many servers in a computer room that temperatures soared to almost 100 degrees. Some of the computers started malfunctioning, and in one case several servers failed altogether, said Kent Hoyos, chief information officer for the 443-bed hospital. The hospital's technicians worked frantically to get more cooling into the 6,000-square-foot room, but they still couldn't get temperatures down much.

"We were just on the edge all the time," said Mr. Hoyos. The hospital has solved its problem by spending about \$500,000 to install a network of 20 overhead air conditioners.

Many other businesses and institutions face a similar predicament. A 2005 review of 19 data centers by the Uptime Institute, a think tank in Santa Fe, N.M., found that most of the centers couldn't cool their computer equipment. Moreover, the review found, 10% of the server "racks" -- or panels of servers -- were receiving air hotter than they were specified to handle in order to remain reliable. "This is hitting businesses like a ton of bricks," said William Clifford, chief executive officer of Aperture, an industry consulting firm in Stamford, Conn.

If a heat problem persists or worsens, a business ultimately may have to build a new facility. Stand-alone data centers can cost upward of \$10 million.

Managers of a computer center for the National Center for Atmospheric Research in Boulder, Colo., have been adding more air-conditioning units to attack their heat problem. Typically, the units are mounted against walls so the cool air can fan out across the room. But after adding five big air conditioners to an existing seven, the managers at the U.S. government facility said design issues of the building and other factors make it so they won't be able to keep the 7,200-square-foot room cool enough much longer without expanding to a new site.

Computer managers are turning to a range of other ways to cool the hotter new machines. One solution is to pipe cooling liquid directly on top of the microprocessor, which generates much of the heat. A liquid-cooling product called SprayCool, made by ISR Inc. of Liberty Lake, Wash., costs about \$25,000 per rack of servers.

Other businesses deploy cabinet-size air conditioners that can be rolled right next to a row of computer racks -- providing better cooling than wall air conditioners. Officials of APC-MGE, West Kingston, R.I., said demand has been running so brisk for its line of InRow rack coolers that sales in 2006 tripled from 2005, with sales on track to more than double again this year. The unit of France's Schneider Electric SA doesn't disclose sales figures.

Another vendor, Emerson Network Power, of St. Louis, reports sales of its Liebert XD products -- smaller air conditioners that fit on top of server racks and are connected with pipes containing waterless refrigerant -- doubled in 2006 from the year before. The unit of Emerson Electric Co. also declined to cite specific numbers.

One of the customers for the Emerson product was the Pomona hospital. Another was US Internet Corp., a small Internet-service provider in Minneapolis that by 2005 was experiencing daily breakdowns of its servers and storage drives due to temperatures soaring above 90 degrees in one of the company's data centers in Minnesota, officials there said. "Our issue was we were frying our computers," said Travis Carter, co-founder and chief technology officer of the company. "Quite frankly, we were dead in the water." US Internet has since installed a network of the Liebert XD air conditioners to help bring down room temperatures in the center to 70 degrees. Breakdowns are now a rarity.

Some tech vendors are looking to the floor for answers. Degree Controls Inc. of Milford, N.H., sells floor-mounted tiles for \$1,800 each that are outfitted with powerful fans that direct cool air onto the servers. It can cost as much as \$50,000 to configure a computer-room floor, but people who have used the tiles say they have helped. Officials of Navisite Inc., a provider of computer-room facilities for corporations, said they can handle heating loads up to 200 watts a square foot in places where the tiles have been installed.

Advanced software also is being deployed to attack the problem. Hewlett-Packard Co. in November announced an energy-management system called Dynamic Smart Cooling that is designed to help deliver cool air where it is most needed in the computer room.

Then, there are truly low-tech approaches. At the Data Center World show in Las Vegas last month, attendees crowded around a booth that featured sections of foam to plug holes and openings that let cool air seep out in computer rooms. Sections of the material by Aclok Inc., Salt Lake City, sell for \$35.